

**REMARKS**

**1., 2. Detailed Action**

Claims 7,8,10,12 are currently amended to only claim material in the specification. New figures 5-7 have been deleted in the drawings and the text supporting figures 5-7 has been deleted. These current amendments reduce the drawings and the specification to the originals submitted with the filing.

**3. Drawings**

Figures 1-3 are corrected to include "Prior Art" markings in the title.

Figure 4 is marked "Deleted Sheet" in the top margin and the replacement figure 4 is marked "Replacement Sheet" in the top margin and is corrected to substitute the norm-squared error metrics for the prior norm error metrics in order that the least-squares sum of these error metrics are well-behaved functions of the Wavelets, and to change the title to identify that the least-squares error metrics are calculated in the figure for both quadratic error metrics and norm-squared error metrics.

Figures 5,6,7 have been deleted since they introduce new material which is not supported in the original specification and are marked "Deleted Sheet" in their top margins which replace their former markings "Replacement Sheet", "New Sheet", "New Sheet" in their top margins.

Replacement figure 5 is marked "Replacement Sheet" in the top margin and is the original figure 5 with the title corrected to identify that the figure presents a flow diagram of the least-

squares recursive solution algorithm for both quadratic error metrics and norm-squared error metrics.

Figures 6-8 are now the original figures 6-8 and their markings "Deleted Sheet" in the top margins have been removed to indicate that these figures 6-8 are now included in the currently amended drawings.

#### **4. Specification**

The changes in the specification which were made to support figures 5,6,7 have been deleted along with these figures from the drawings. The original figure 5 has been restored in the drawings and the original description of figure 5 has been restored in the specification. The currently amended specification is now the original specification with some editing changes to correct mistakes and without adding new material.

The marked-up currently amended specification contains the deleted explanation of the Matlab software flow diagram which makes it somewhat longer than the original specification.

#### **5. Claim Objections**

Status for claims 7,8,10 and 12 for the marked up version and the clean version are now the same,

Spelling errors are now believed to have been corrected.

Claims 10 and 12 are currently amended to refer to claims 7 or 8 wherein claims 7 and 8 are currently amended to be independent. This should satisfy 37 CFR 1.75(e).

The period in claim 12 has been replaced by a comma.

**6. Claim Rejections - 35 USC § 112**

The currently amended claims are believed to meet the criteria of 35 U.S.C. 112 in that they now clearly describe what is considered to be the invention and in a manner which enables any person skilled in the communications technology art to replicate and implement the algorithms and performance and properties of these multi-resolution Wavelets for waveforms and filters.

**7. Claim Rejections - 35 USC § 112**

Claims 7 and 8 are now restricted to describing the least-squares recursive solution algorithms clearly documented in figures 4,5 in a manner such that one skilled in the relevant art can replicate and implement the least-squares algorithms using the information available in figures 5,6 and in the original specification.

The key technology to understanding the algorithms in claims 7 and 8 is 1) the construction of the least-squares error metrics which are described in great detail in

- equation 23 for the passband and stopband metrics
- equation 24 for the deadband metric
- equation 25 for the orthogonality intersymbol interference (ISI) metric
- equation 26 for the orthogonality adjacent channel interference (ACI) metric
- equation 27 for the weighted sum J of these least-squares error metrics,

and 2) the two examples in claims 7 and 8 of the least-squares recursive solution algorithm defined in figures 4,5 using quadratic error metrics and norm-squared error metrics to minimize "J" by finding the "optimal" Wavelet impulse response in frequency and the corresponding optimal Wavelet impulse response in time.

Claim 10 has been currently amended to describe the application of the multi-resolution Wavelets in claims 7 or 8 to a polyphase filter bank which has been the main theme throughout the specification.

Claim 10 describes how the technology documented in equations (11), (18), (29) is used to enable a Wavelet for application to a polyphase filter bank, to be derived from a mother Wavelet designed at baseband. Multi-scale parameters used in this derivation are clearly defined in the claim with the definitions documented in the specification. The actual implementation of the calculation is clearly defined in equations (11), (18), (20) and their supporting network of equations.

Claim 12 has been currently amended to describe some of the properties of the multi-resolution Wavelets in claims 7 or 8.

The properties found in equations (11), (18), (18) enable a single Wavelet design to be used to generate Wavelets for multi-resolution applications.

The design of the Wavelet waveform with no excess bandwidth is one of the key performance goals for linear phase filter design in this specification.

Accordion behaviour of multi-resolution Wavelets is described on page 21 in the specification.

Figures 7,8 are examples of how the linear-phase design techniques was modified to apply to bandwidth efficient modulation and synthetic aperture radar.

The last observation simply states there are other optimization algorithms for finding multi-resolution Wavelets.

**8. Claim Rejections - 35 USC § 112**

Currently amended claims are believed to satisfy the 35 U.S.C.112 "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention".

**9. Claim Rejections - 35 USC § 112**

Currently amended claim 7 has been rewritten to remove the reference to "the iterative algorithm" and to remove the other limitations by restricting the description to figures 4,5.

Currently amended claim 8 has been rewritten as an independent claim and to remove the other limitations by restricting the description to figures 4,5.

Currently amended claims 10,12 have been rewritten to claimed applications and properties which are supported in the specification with specific references identified.

**10. Response to Amendment**

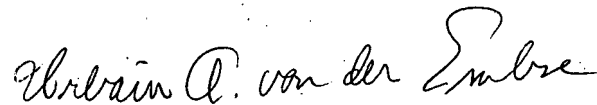
Currently amended drawings have deleted the figures 5,6,7 which introduced new material not supported by the specification and figure 5 is now the original drawing with minor corrections.

Claims 7,8,10 and 12 are currently amended with the restrictions that they are fully supported by the original specification, as discussed in detail in "7" in the previous.

**11. Conclusions**

Thanks for all of your help and guidance.

Sincerely,

A handwritten signature in cursive script that reads "Urbain A. von der Embse".

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